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ABSTRACT

This booklet contains activities and teaching suggestions that will help elementary students become aware of their environment. It will help teachers foster among their pupils an understanding of their place in nature, a sense of wonder, a reverence for life, thoughtful use of resources, and the realization that the earth is a home to be shared. There are four parts to the booklet. Part I deals with "The Child's Sensory Awareness." Activities involve students in looking, listening, touching, tasting, and smelling. "The Child as a Part of Nature" is the topic of Part II. Activities help students understand their basic needs--air, water, food, shelter, and interdependence. Discovery projects in the classroom involve students in maintaining an aquarium, growing plants, and observing the behavior of animals. Students are also involved in field trips to weather stations, filtration plants, supermarkets, and animal shelters. Part III treats "The Child as a User." Children discuss topics such as bicycles, clothing, and soft drinks and visit museums, a public library, and a newspaper publishing company. "The Child in the Community" is the topic of Part IV. Students are involved in discussions about sharing in the family and home, at school, in the neighborhood, in their country, and in the world. The last quarter of the booklet contains a film list, a teacher's resource list, and a children's reading list.
(Author/RM)

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COMING TO OUR SENSES

An Environmental Approach to Teaching at the Elementary Level

"....the essential business of the school is not so much to teach and to communicate a variety and multiplicity of things, as it is to give prominence to the ever-living unity that is in all things."

Friedrich Froebel,
The Education of Man

SP 014 002

Judith Bock
Sandra Feldman
Susan Harpp

" .... all education is environmental education...."

Mark Terry,

Teaching for Survival

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CENTRE FOR ENVIRONMENTAL EDUCATION
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PREFACE

Even the youngest school child can learn that a healthy environment looks, feels, smells, tastes and sounds better, and that we all affect our surroundings for better or worse.

It is hoped that this booklet will be useful to teachers in fostering among their pupils:

- an understanding of their place in nature
- a sense of wonder
- a reverence for life
- thoughtful use of resources
- the realization that the earth is a home to be shared.

There has been no suggestion to introduce a new subject, but rather an approach to subjects already being taught which will link these areas of study together in order to emphasize the relationships between all aspects of life, the unity of all things. Also, the approach should encourage the child to consider his dependency on his environment and the impact of his own choices and actions on it, rather than to present him with problems over which he has no control.

To have included all related material would have been impossible, as the ways in which awareness can be heightened are infinite. Where ideas leave off, it is hoped that the teacher's imagination will take over.

Although it is Montreal-oriented, "Coming to Our Senses" has been widely distributed in Canada and the United States since its first edition in 1971; its popularity indicates the universality of this approach to environmental education, as well as the adaptability of the handbook to local conditions.

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PART I

THE CHILD'S SENSORY AWARENESS

"Our senses were made for the environment .... the problem of environmental awareness is the problem of sensory awareness."

Mark Terry

LOOK, LISTEN, TOUCH, TASTE, SMELL

As the pace of life quickens in the world around us, we take less and less time to stop, look and listen. At times we barely taste our food much less see the sky, hear the birds or smell the air. Teaching children to understand and take an interest in their environment is, primarily, a matter of encouraging the full use of their five senses.

THE CLASSROOM AS A PLACE TO LIVE

A sensory awareness approach could begin by helping the children become more conscious of their immediate surroundings. The classroom can be understood as a "home" with certain necessary features. Have the children explore the room, its size, shape, colours, contents and sounds.

What is there here?

Air is here; water must be provided; there are electrical outlets, plumbing, radiators, vents, windows; materials and their storage facilities and provisions for their disposal.

To encourage more vivid recognition of the various materials in the "habitat", why not "inventory" the classroom components. List what around you is wood, plastic, paper, rubber, fabric, metal, liquid, mineral, etc. The children need to know that their pencils, erasers, paper and books are all originally from nature, are valuable, and cannot be replaced without using up some precious, limited resource. A useful discussion could begin with the need for light: where does it come from? is it natural or manufactured?

Change and Adaptation

To introduce the concepts of change and adaptation, take the temperature reading during different times of the day and open windows

to change the air. Rearrange the desks to show how different seating patterns alter the way we communicate, *e.g.*, try crowding them all into one corner of the room for an hour. How does everyone feel? Do not collect the trash for a certain period of time. The environment is not a static entity and the children need to know how they interact with their surroundings. To graphically show just what our dependencies are, try to conduct a class with everybody "blind" or "deaf" (as suggested in Mark Terry's *Teaching for Survival*).

And what about all the different textures, colours, temperatures, noises, populations, smells or tastes within the classroom? Discuss the ways that students are affected by these factors, such as personal comfort, ability to concentrate, temperament, etc.

Conversely, how does the child affect his environment? For example, what changes occur in the room when a child gets up to sharpen a pencil? It is important for the children to realize that everything they do affects others.

STIMULATING SENSORY AWARENESS THROUGH GAMES

The following games (mostly taken from *Learning About Nature Through Games* by Virginia Musselman) may be modified to enrich various subjects at any level.

Indoor Experience

Sight

- Fill baby food jars with food products all of one colour, *e.g.*, white, and try to identify them. Use flour, salt, sugar, baking powder, baking soda, *etc.*

- Have the class form two lines facing each other. They turn around on signal, and everyone rearranges two articles of clothing (removes glasses, unbuttons sweater, *etc.*). Face each other again and try to guess opposite partner's changes. If you wish to inject a competitive element, the team with the most correct guesses wins.

- Pantomime feelings such as "too hot", "too cold", a taste of something, feeling sticky, or pantomime various animal motions.

- Look for all the round objects, or square ones, *etc.*, in the classroom, or those with similar colours.

- Tell the children there will be some change in the classroom for them to notice every morning, and then remove or add something that changes the appearance of the room.

Sound

- Identify objects behind a curtain as they are dropped, such as a pencil, coin, cup, blackboard eraser, rock.

- Listen to animal sounds or bird calls on records and identify them. Imitate them. Tape the proceedings, if possible.

- Blindfold pupils who have been previously divided into groups of 5 or 6. Have them guess who is speaking.

- Use a stethoscope (an inexpensive $3-$5 toy article does very well) for listening to each other's heart, to music (put it right against the speaker of the record player), to voices, walls, *etc.*

- Listen to "silence" - all sit without speaking for a short period, then describe the sounds heard while everyone was "quiet".

- To demonstrate the importance of having two functioning ears, have one student sit in a chair, blindfolded. Stand in one spot and tap two pencils together, and have the blindfolded student point to the spot where the sound came from. Move to different spots, front, back, high, low, *etc.* Then have the student cover one ear with his hand. Do the experiment again. This time he will find it much harder to point to the right spot.

- Gather pairs of objects that will sound different when dropped, such as rock and stick, book and ball, spoon and crumpled paper, carrot and marshmallow. Have the students listen to the noise each makes as it is dropped. Then ask all children except one to cover their eyes, while one child chooses an object to drop. The others try to guess which object was dropped.

- Collect 6 or 8 identical boxes, such as tobacco cans, coffee cans, plastic ice-cream containers, *etc.* Make pairs of sound boxes by putting objects in the containers, such as rice, sand, stones, marbles, beans, paper clips, cotton balls, popsicle sticks. Make two identical boxes for each sound. By shaking the boxes, the student tries to match the identical ones. Then he may check his accuracy by opening the lids.

Touch

- Divide class into small groups, blindfold, and identify each other through touch only.

- Pantomime feeling states or situations, such as walking on pebbles, touching a hot stove, *etc.*

- Borrow a small scale (baby scales will do) and play at guessing weights of objects such as an apple, tin can or book.

- Put familiar household objects (toothbrush, sponge, toy car, paper cup, comb, spoon, stone, crayon, *etc.*) into a bag or box with a hole cut in the top. Let students reach in and try to guess what they feel before pulling out the object. To vary, play the game using only fruits or vegetables.

- Assemble some household objects with opposite textures and characteristics, such as:

  wet/dry - sponges
  rough/smooth - pretzel, uncooked spaghetti
  hard/soft - stone, cotton ball
  hot/cold - carrots

  Put these in a container and ask the students to find a particular object by reaching in and not looking.

- Make a "feel board" for the classroom. Glue pieces of objects of differing textures (sandpaper, aluminum foil, fur, fabric, sponge, rice, *etc.*) on a large piece of cardboard. When the students are familiar with the various textures, they can try to identify them without looking.

- Buy several sheets of sandpaper of varying coarseness. Cut each type into two pieces, 3 or 4 inches square, and glue them on pieces of cardboard of the same size. By feeling the sandpaper squares, the student tries to find the two that are the same coarseness.

- Find scraps of fabric of different textures (corduroy, velvet, burlap, vinyl, terrycloth, silk or rayon, carpet scraps, fur), and make squares of these on cardboard. Make two squares for each fabric. Put one set of squares in a box or bag and leave the other set out for the student to see. He then chooses one square from the visible pile and tries to find its twin from inside the box or bag.

Smell

- How far does smell carry? Put some coffee or spice in a saucer. Approach it slowly. See how far away from it you can go and still smell it. Repeat the experiment after letting the saucer stand for one hour.

- Open a window and smell the air.

- Smell a tissue after having cigarette smoke blown through it. Comment on smoky rooms and clothes.

- Blindfold pupils and ask for identification of smells in baby food jars containing, for example, vinegar, onion, soap, mustard, *etc.*

Taste

- To show the dependency of taste upon smell, blindfold a pupil and get a slice of apple and a slice of pear. Give him the apple to eat but at the same time hold the pear under his nose. He will tell you he is eating the pear.

- Where is taste? Dissolve 1 tsp sugar in half a glass of water. Dip a toothpick into this and touch lightly to different parts of the tongue. Where does it taste the sweetest? Repeat with salt, vinegar, aspirin.

- Think of as many different words describing tastes as you can.

- Have a pupil guess what familiar food he is eating without looking at it. You might use chocolate chips, orange slices, marshmallows, cereal, banana, cookies, raisins, bread, pickle, *etc.*

- Assemble a few foods that have opposite tastes, such as

  sweet/sour - honey, lemon juice
  sweet/bitter - chocolate chip, unsweetened chocolate
  salty/not salty - salted cracker, cookie or pretzel, carrot stick

  Students can taste the opposites and discuss them.

Outdoor Experience

The outdoor experience need not necessarily be an involved field trip. The school yard or local park illustrates certain environmental features. If there is good introductory work done in the classroom beforehand, the experience is clearly more effective and lasting.

When outdoors, look for the following visual features:

- type of school (or any other) building: wood, frame, stucco, brick, other.

- trees, shrubs, grass, flowers.

- water.

- eroded areas, barren areas, plant areas, rock and mineral areas.

- animal signs.

Sight

- Have a treasure hunt (perhaps on Mt. Royal). Find a bit of moss, a live insect, a pine cone, burr, pebble that shines, seed, nut, white flower.

- Hide pine cones and have everyone look for them.

- Look for objects of certain colours. Try to make a colour chart out of nature materials.

- Observe a square yard of land carefully. It can be described as a minature habitat. Look for signs of life, moisture, temperature, plant life. Disturb it by walking on it, and see if there are any changes.

- Lie down and view the world as a bug would. Climb to the highest point available and get a bird's eye view.

Sound

- Listen for two minutes and then discuss the different sounds heard. Go to a street corner, then behind a building or trees (for their muffling properties) and compare the two experiences.

- Space several pupils at intervals with their ears to the ground. Tramp on the ground to see how far the sound will carry.

Touch

- Find the hottest, coldest, wettest spot in the area.

- Ask each pupil to find a rough, smooth, warm, cold, *etc.*, object.

- Feel the bark of different trees. Are there more rough or smooth trees?

- Collect various articles in plastic bags, such as pine cones, pebbles, bark, feathers, berries. Place an assortment in the bags and pass them around for an "eyes-shut-touch-only" fast feel by each person. Each child later tries to recall as many as possible. Then empty all contents into one pile and have the blindfolded children try to sort the pile into like objects by touch only.

Smell

- List different smells experienced: Ask children how many different smells there are outside, then walk around the block, park or town and see how many smells they can identify. Keep a list and compare theirs and yours.

Ask children: Are living things, plants and animals, formed the way they are for good reasons?

NATURE ACTIVITIES AND CURRICULUM

Nature activities can be incorporated into the curriculum at any level. Here are some suggestions:

Language Arts

- A live Show and Tell. Everyone who can, brings a pet (except for cats and dogs). Each owner tells all he can about it; its name, feeding habits, how to hold it, how to care for it. Possible pets: chicken, turtle, hamster, white mice, fish, *etc.* Examine the pets carefully; look for details about the eyes, ears, feet, claws, tail, teeth, footprints. What do all these have to do with the way that animal lives, eats, and defends itself?
- Note-taking (field notes).
- Letter writing and spelling "nature" words.
- Creative writing, such as poems, stories or songs.
- Reading stories and poems of, or by people who loved nature.
- Making charts, posters and bulletin board displays.
- Writing newspapers.
- Picking out words that don't belong: (flower, tree, bird, shoe); (field, hairbrush, forest, pond).

Mathematics

- Map-making.
- Measuring an acre; or measuring the school yard in square feet.
- Estimating heights of trees, buildings, telephone poles, *etc.*
- Estimating distances.
- Counting, measuring, using leaves to show meaning of numbers.
- Making graphs of temperature readings.

Science

- Dig a hole or trench in the school yard about 2-4 cubic feet. Fill with vegetable garbage, then sprinkle with bonemeal, lime and earth. In the Spring, this compost should be ready to spread - or plant on top of it.

Art Activities

- Jewelry from seeds and nuts.

- Leaf rubbings made by pressing a leaf, vein up, on paper. Place another sheet of paper on the top and crayon over the paper,pressing down on the leaf.

- Pencil rubbings of textures found outdoors.

- Charcoal sketches of plants and flowers.

- Sand pictures.

- Collages with native materials.

- Animals made from twigs and painted.

- Placemats made by placing leaves between two pieces of wax paper cut to placemat size. Staple the sides together, then press wax paper with cool iron. This makes the leaves adhere to the paper and they won't slip. Add a border of construction paper or cloth.

Geography

- Study of a river points up direction, location and origin of the river, how soil erosion is caused by the water, how impurities find their way into it.

- Study the location of your city or town; why was it built just here? What natural factors made it a good or bad choice for a town site?

PART II

THE CHILD AS A PART OF NATURE

"Nature never makes anything that is superfluous"

Aristotle

HE IS A LIVING PART OF NATURE

If a child is asked what he is, he may reply, "a person" or "a student". He is unlikely to say "a part of nature" or "a living thing". However, it is important for him to understand that, first and foremost, he is part of the natural world.

Also, he needs to know that he is a living part of nature, unlike a stone or a cloud, for example. Everything that lives must have air, water, food and shelter if it is to go on living. In this respect the child is no different from other living things.

His health will depend largely on the quality of these four essentials. Yet no amount of information about the benefits of proper diet, fresh air and exercise, or the harmfulness of smoking, taking drugs, *etc.*, will be worth much to the child who has not learned to respect his own body as a living unit.

He needs to learn about his close relationship to animals. Man tends to forget that he is only one of countless species, each forming a link in a chain of life. Survival for one is dependent on many others which play different and vital roles in maintaining the "balance of nature".

HOW TO HELP HIM UNDERSTAND HIS BASIC NEEDS

The child does not need the help of scientific texts or a science teacher to begin to understand his place in nature.

- He needs to be asked questions related to life in the natural world.
- He needs to be given the opportunity to discover for himself, with his five senses, the answers to these questions.

What follows, then, are questions which, in most cases, may be asked at any grade level (understanding, of course, that the answers given will

depend on the age and awareness of the student), and suggested ways to encourage discovery in and out of the classroom. (See Film List, page 37, for further details on suggested films).

Air, Water, Food and Shelter

All are essential to life and all are limited in supply. In each case ask these key questions:

- How do we know we need it?
- Where does it come from?
- How do we use and change it?
- Where does it go?

Air

How do we know we need air?

- Ask the children to hold their noses and close their mouths for a few moments.
- Ask them to hold a paper bag tightly around nose and mouth while they breathe in and out for 2-3 minutes; as CO_2 (a waste product) becomes more concentrated, they will breathe deeper and faster to get more oxygen.
- Show what happens to a candle deprived of oxygen.

Where does air come from?

- How much air is there and where? Think about how high it goes. What are the outer limits of the atmosphere, or air, that we can breathe? Does it go up endlessly, or is it produced somewhere? No, it exists in a limited amount and is changed by everything that uses it.
- What might have used the air before us?
- Why should we open our windows?
- How can we tell that air is moving? Observe the movement of leaves, clouds, smoke, *etc.*

How do we change the air?

- How do our bodies use it?

- What happens to the air we breathe in and out?
  Oxygen is used up and carbon dioxide, a body waste, is breathed out (respiration).

- How do green plants use air in making food (photo-synthesis)?
  They take in CO_2 and give off oxygen. If they did not return oxygen to the air in this way, we would have run out of oxygen to breathe a long time ago (See *Golden Book Encyclopedia, Vol.12, "Plant Factories"*).

- What, besides CO_2, does man put into the air? - fumes, dust, *etc.* from factories and cars.

- Why must he learn to help plants clean the air?

Where does air go?

- Where does the wind take the air?

- What uses it next? plants, animals, other people, cars.

- Is the effect harmful or beneficial to life?

Note: The following films point out the use and misuse of air:

King Size - anti-smoking cartoon

Paradise Lost - very short animated film in which a bird and a butterfly succumb when their garden is too heavily sprayed. Beautiful, but a strong statement - suitable for Grades 6 - 7.

Water

How do we know we need water?

- Suggest that the children drink nothing from breakfast until the end of the school day.

- Observe two plants both in proper light and soil, but one deprived of water.

- What percentage of our bodies is water?

- Fill a glass about half full of water and add red food coloring. Cut the end off a stalk of celery, put it in the glass and leave it for 3 hours or more. Then examine the celery. Have the leaves and stalk changed color? Cut the stalk crosswise and see the tubes where the red water goes up the stalk.

Where does water come from?

- What is the actual source? (St. Lawrence River in the Montreal area).

- How does it get to our house or school?

- Does anything happen to it before it enters the pipes which lead to the tap (*e.g.*, filtration plant)?

- How else do we get water? (rain for the garden, in food and drinks, *etc.*).

- In what forms do we find water? - clouds, snow, mist, ice, steam, *etc.*

How do we use and change water?

- How do we use water in our bodies, our school, our home, our community?

- What do we put into it as we use it? - body wastes, soap, oil, chemicals, *etc.*

- What do we mean by "good drinking water"?

- What would the children think about drinking obviously foul water? (*e.g.*, slimy water from a flower vase or a glass of melted March snow). Ask the children to smell it, look at it, put a finger into it.

- Would a fish respond if his water were in some way poisoned? How?

- How can we clean water? (filtration plants, sewage treatment). How does our city do it?

- How could we waste less?

- Where (in the country and in the world) is water scarce? Why? What is done to conserve it?

Where does water go when it leaves us?

- Where does it go after it disappears down the drain? (St Lawrence River in the Montreal area).

- Does anything happen to it on the way? *e.g.*, is it cleaned before flowing back into the river? The City of Montreal still has almost no sewage treatment.

Film: *Rise and Fall of the Great Lakes*

Reference Book: *World Book Science Year 1971.*
My Water Book (Ontario Dept. of the Environment).

Food

How do we know we need food?

- Suggest that the children go hungry for a specified period; how do they feel?

- Make the analogy of food:people as gas:cars; this may lead to a discussion of energy. Where does energy come from? Why is sunlight necessary for the growth and production of food? What besides sun is needed to grow plants?

Where does our food come from?

- What foods do we eat and where do they come from? Take a trip to a grocery, or invite a store manager to speak to class.

- Trace it back from the child to the source; trace various kinds: fresh, frozen, canned, *etc.*

- Why do some parts of the world have difficulty growing crops?

How do we use and change food?

- How do our bodies use it?

- What happens if we eat too much or too little? If we eat the wrong things? For example, put a chicken drumstick bone in a jar full of vinegar. Cap it tightly and leave it for one week. Then take the bone out of the vinegar and rinse with water. The bone will be soft and easily bent. The vinegar dissolves the calcium in the bone. (Film: *Menu*, see p.39).

- How do we change food in processing and preparing it?

Where does it go when we've finished with it?

- Trace your garbage to its final resting place.

- In discussing food, the role of soil could be included. How is it enriched, conserved, lost or damaged? How does nature reuse dead material? Bury some bits of plant or food material; dig a few months later to see if it has disappeared. What about non-living (inorganic) materials - glass, tin cans, *etc.*? Bury them also and see which substances degrade or break down.

- Experiment by planting bean seeds in jars of soil and sand. Give equal amounts of water and sun, and observe which plants grow better.

Shelter

How do we know we need shelter?

- Have the children imagine their lives without shelter in the different seasons.

- What do we use for shelter besides buildings?

Where do the materials for our shelter (homes) come from?

- What are our homes made of? Why?

- What does climate have to do with the kind of shelter we have?

How do we use and change shelter?

- How do we keep our houses warm? cool? dry? safe?

- Why is a school built differently then a house?

- Why do new houses look different from older ones? Are they made of the same materials? How are old houses heated?

- Have the changes made in houses caused any problems? Do our homes contribute to pollution? How? Do our homes disturb the habitat of some kinds of wildlife?

What happens to our shelter when we have finished with it?

- What would happen to your house if your family moved out and no one else moved in?

- Why do we tear down some of our buildings?

- What happens to the wreckage? How can building materials be conserved?

- What can we do around our homes to make them less wasteful of resources (*e.g.*, turn off the lights, fix leaky taps, *etc.*).

Note: A comparison with animal shelters is helpful here. What kinds of shelters do animals have? How can we prevent them from being disturbed (*e.g.*, forest fire prevention, supporting conservation groups, learning about nature and the preservation of wild places from encroachments like the snowmobile, *etc.*). See section on Discovery and project on Endangered Species.

Interdependence

The child and all animals share a common need for air, water, food and shelter, but the varieties in life forms are also essential to the survival of life. All species are interdependent.

- In what ways does the child look like other animals? Unlike them? *e.g.*, children have thumbs but animals don't. What things would be more difficult without a thumb? (*e.g.*, buttoning buttons). Take thumb prints of pupils using ink pad and index cards. Compare prints - all are different.

- In what ways does he move like they do? Differently?

- How does the food eaten by children and animals differ?

- What sounds does the child make? Why? What sounds do animals make? Why? What's the difference between sound and noise? What noises bother the child? the animal? What kinds of noises are associated with the city and the country?

- How does the child communicate? How do animals communicate?

- What can certain animals do that man can't? (*e.g.*, fly without polluting the air, *etc.*).

- How does a child's family protect him, teach him, and show love and concern for him? How do animals do this?

Films:

Animal Movie - animals move in different ways.

Fine Feathers - different kinds of living things are made the way they are for good reasons.

Tuktu and His Animal Friends - how animals and man share a life in a harsh and difficult environment.

DISCOVERY

In the Classroom

Animals (fish, turtles, ants, gerbils)

- Observe answers to questions above. *CAUTION:* This experience can be of negative value if animals are not properly cared for in as close to natural surroundings as possible. Make sure they have plenty of space, proper food, fresh water and exercise facilities, and avoid over-handling.

- Teach the children to feel for and like the animals - try to imagine being one; never tease, confuse, maul or hurt any animal, even a small bug; if an animal seems ill, show concern and get expert help; if an animal dies, point out that this is symbolic of a fault in his environment, or simply a part of the natural life process.

Mini-environments (excellent for showing the interdependence of animal and plant life in a complete habitat or ecosystem).

The aquarium - a water environment.

- The necessary elements of light and water purification found in a natural environment are provided here by lamps, pumps and filters. The filtering system is a simplified sewage treatment plant.

- Does your school have an aquarium? Is it well maintained? If not, what happens?

The terrarium - a land environment, a world under a dome.

(See *Indoor Gardening*, a Ladybird book).

- Can be very simple (living plants in a sealed jar) or very elaborate.

- Plants (*e.g.*, ferns and moss) from the forest floor can be arranged on a tier of flat rocks. Sprinkle the "garden" with water and cover with a plastic dome (a covered cake plate can be used). For complete instructions, write the Bureau of Outdoor Recreation, Department of the Interior, Washington D.C., for free booklet, *Minature Environments* .

- Children can observe "rain" condensing on the dome and falling back onto the "land". Insect life may even emerge if there are eggs in the system and the conditions are right.

Window-sill garden

- Child can plant, grow and observe cuttings and seedlings, their response to water, light, soil conditions, *etc.*; can take them home and transplant them (late Spring).

- Discuss various parts of plants we use for food. Can be coordinated with a trip to the supermarket and film: *Menu* described in the Film List.

- Flower seeds could be started in the classroom and transplanted to the school-yard garden. Many sprouting methods may be used. Some of the easiest and most dramatic are:

(1) Cut about a half-inch off the large end of a carrot, beet or parsnip. Remove leaves, if any. Place the half-inch piece in a shallow disk of water, supported by pebbles. The greenish top should be out of the water. Add water when necessary. New leaves should grow after awhile.

(2) Stick three toothpicks into the wide end of a sweet potato. Put it on top of a clear glass or jar and add water until about half the potato is covered. Put it in a dark place until it sprouts (about two weeks). Add water when necessary. Once sprouted, it should be put in the sun and it will grow a pretty vine.

Indoor Projects

Scrapbooks, nature art work (posters on water and air care, litter control, *etc.*); crafts and gifts made from materials gathered on nature walks.

Conservation programme for class or school - activities and education centered on conservation of resources used every day, *e.g.*, paper, electricity, water, heat, *etc.* Emphasize that everything we use comes from nature.

Endangered Species project - Gr.4 - 7

Choose one of a long list (available from Canadian Wildlife Federation, 1419 Carling Ave., Ottawa 3) of endangered species: peregrine falcon, whooping crane, bighorn sheep, harp seal, sea otter, spotted turtle, cougar, grizzly bear, black-tailed prairie dog.

- Describe characteristics and life cycle.
- Why is it in danger (see section on Shelter)?
- Why should we be concerned? Is it our fault?
- Are we more wasteful of animals than people of other cultures, like the Eskimos? How? Do we need to wear furs, especially from animals not used for meat, like the harp seal, the beaver, *etc.*?
- Remembering that animals share the earth with us, how can we help prevent waste and cruelty?

Write for information to:

Canadian Wildlife Federation (see above);

Royal Bank Newsletter, Head Office,
Place Ville Marie, Montreal
for Vol. 52 No. 8, *"Conserving Canada's Wildlife"*;

Defenders of Wildlife,
2000 N. St., N.W.
Washington D.C. 20036
U.S.A.

- Express concern to Government: address letter to Minister of the Environment, Environment Canada, Ottawa. Ask about laws to protect wildlife and ensure humane treatment (trapping) *etc.*

- Put your project on display for school and parents.

For younger children

What animals used to live around here that we don't see anymore? Why have they disappeared? Where have they gone?

Reading for Children

Animal Classics - emphasis on values. See Children's Reading List, pages 44 to 57.

Rascal, Sterling North.

Black Beauty, Anna Sewell.

Resource Books

A Place to Live, Jean Bendick - Parents Magazine Press No. 347 - ecology for young children.

Great Big Air Book, Richard Scarry - for the very young.

Understanding Ecology, Shelley Grossman - Grosset & Dunlap - excellent pictures and text for Gr.4 - 7.

World Book Science Year 1971, A Lake Decays - transparencies on water deterioration.

Indoor Gardening - Lady Bird Series. Practical suggestions on growing plants and setting up various mini-environments.

Discovery Outdoors

Where to go

- School yard or community park.
- Large city park - Lafontaine, Mt. Royal, St. Helen's Island, *etc.*
- Large nature areas - Mont St. Hilaire (Gault Estate) (467-4010).

  Wildlife sanctuary 20 miles from Montreal. Half-day ecological tours for Grade 4 and under. Full day tours for Grade 5 and up. Skilled leaders are available by appointment.

- Morgan Arboretum (Macdonald College) (457-6580, local 326).

  600 acre woodlot, a wildlife sanctuary with hiking and skiing trails. Education programme, offered in May and June, is designed for kindergarten to Grade 4. One and two hour guided field trips at 10 cents per child.

- Arundel Natural Science School.

  Write Melvin Graham, Director, Arundel, P.Q., for information about his popular programme. Tours feature guided nature study, observation of animals and sugaring-off.

- Macdonald Farm (457-5315)

  Guided tours of barns and grounds offered at 50 cents per child. An opportunity to see a great variety of farm animals on a working farm in an area where most farms have been sold to real estate developers.

Other related facilities:

- Botanical Gardens; Dow Planetarium; Aquarium; Granby Zoo.

Historical sites and museums: (See also Museum section in Part III)

- Upper Canada Village (to observe how people used to fulfill their needs more directly from nature).
- McCord Museum and McGill University Campus (to illustrate how the city grows - point out that in the old days McGill was a farm out in the country and Montreal was a tiny village beside the river).

- Ft. Lennox (Ile-aux-Noix, Que.) (to illustrate the concept that while man's needs and goals change, nature's laws prevail).

Planning - an essential aspect of a successful trip.

- Discuss what you might see and do. Get information on the area's plant and animal life. Show film, *e.g.*, *"A Tree is a Living Thing"* (Gr. 3 - 5); *"The Changing Forest"* (Gr. 5 - 7).

- Refer to available source material on outdoor education (see next section).

- Collect equipment you and children will need - pencils, notebook or sketchpad, plastic bag for specimens and tags, magnifying glass (optional).

- Dress appropriately - be prepared for wet weather - mud, gravel roads, *etc.* Bring raincoat, sweater or jacket, boots or waterproof shoes.

What to do

Kindergarten - Gr. 4. The objective is to have fun while learning.

- See Part I on Sensory Awareness - outdoor sights, smells, sounds, tastes and textures through games.

- Collect specimens for classroom observations and art projects.

- Learn about life and change in the forest (see supplementary material on Morgan Arboretum Programme in the last section of this Handbook, pages

Grades 5 - 7. A more scientific approach may be taken.

- Contact main nature areas and ask for information on guided trips. *"Beyond Four Walls"* - a source book for outdoor education published by PAPT-PACT, available from your science consultant; *"Sand County Almanac"*, Ballantine paperback by Aldo Leopold.

Follow-up: When you return from

a park, ask:

- Why do we have parks?

- How is this one different from others the children have visited? How is it similar?

- Who decides where to put a park? How?

- Who decides whether we need a park?

- To whom do parks belong? Who pays for them?

- What might be here if there were no park?

a forest or farm, ask:

- What is the purpose of the place?

- How would our lives be different if we lived on a farm or in a forest instead of where we live?

- Why is it becoming harder for city children to see wild animals in their natural habitats?

- Why are there fewer farms than there used to be? fewer places that can be called wilderness? What role has the machine played? (tractors, milking machines, bulldozers, *etc.*). What benefits, what damage, result from their use?

a planetarium, aquarium, botanical garden or zoo, ask:

- Why do we need facilities like these?

- What climates are represented?

- What differences are there between plants and animals of different climates?

- What uses does man make of these plants, animals, clestial bodies? In what ways does he abuse them?

- What are some of the reasons for various characteristics of animals (claws, bright feathers, antlers, fur, *etc.*)?

- Why are some species rare and others common?

Other Trips related to Nature

- S.P.C.A.: A visit to the shelter at 5215 Jean Talon W. provides children a chance to see the animals, receive instruction in pet care and humane behavior, and see a film about vanishing wildlife. Appointments should be requested in writing. Call Mme. Beullac, 735-2711 for information about this or other education programmes.

- Weather station.

- Filtration plant.

- Sewage treatment plant (easy or difficult to find in the Montreal area? Why?)

- Supermarket: man's food supply is more readily available in greater variety than ever before; is this true everywhere in the world? See Part III.

  - Look at all kinds of food: which are from plants, which from animals?

  - Find and list 10 essentials, 10 non-essentials, 5 you should try to do without. Are most of the things for sale in the supermarket essential or non-essential, or is it impossible to say?

  The trip could be preceded by the film, *Menu*.

- Neighborhood walk - to look at building materials used for all kinds of shelter.

- What might be used from nature to provide heating, light, water supply, ventilation?

- Listen to the sounds of the neighborhood, recognize and list the smells. How does the air look and smell?

- What are the weather conditions? Has everyone dressed appropriately? Does climate change in this area mean that we would need different clothing if we were to take the same walk 3 or 4 months later? How do we protect ourselves from heat, cold, rain, sun, snow, *etc.*? How do animals protect themselves at times of seasonal change? What clothing is needed by people in other climate zones?

  Trip could be followed-up by showing film, *e.g., Tuktu and the Snow Palace*.

PART III

THE CHILD AS A USER

"Fashion is a form of ugliness
so intolerable that we have
to alter it every six months"

Oscar Wilde

ATTITUDES

At an early age the child, like most adult North Americans, begins to choose, use, discard and replace possessions at an ever-increasing rate, in a manner usually determined by values and attitudes he has picked up from his parents, friends, TV, *etc.* If youngsters are concerned about pollution (like the rest of us, they usually say they are), then cutting down on their own wastefulness is the place to start meaningful action.

CHOICES

Typical choices made by the child include the three mentioned here. However, many other items could be the basis of similar inquiry.

The Child's Bicycle

Discussion

Where did it come from?

Where was it produced? Outline the transportation system that brought it to the store and to the owner; point out the fact that most existing transportation systems are major polluters; so are many factories.

What is it made of? Where did the materials come from? How were they changed in the production of the bicycle?

Now that he has it - how old is it? What does he do to keep it in good condition?

How long does he think he'll have it? Will he out-grow it and pass it on in good condition to someone else, or will it go to the dump, a wreck? Will he turn it in for something fancier (to set the factories and transportation system in motion again)?

Develop the discussion to one on transportation (Gr. 5 - 7).

What advantages do bikes have over cars (cleaner, less expensive to run and buy, easier to park, *etc.*)?

What disadvantages?

The bicycle is an increasingly popular mode of transportation. How can its use in the city be made safer and more practical? Contact Citizens on Cycles (see Appendix, page 59).

What about other forms of transportation - planes, rockets, boats, subways, trains, various kinds of cars? What are their advantages and disad antages? What types of fuel do they require, in what amounts? How many people can they transport at a time?

Why are cars so popular? Why is the design of cars changed so often? Does that always create more waste? What else do we need more of when we have more cars (roads, *etc.*)?

How can we cut down on the use of the car, especially in the city? How could we make cars that last longer?

What happens to cars when we discard them?

Trip Suggestions

Visit Trans Canada Highway construction site:

Why do you think some people were upset about this project? What effects has this road had on surrounding neighborhoods?

Why did the Government think we need this road?

Ride the Metro to the site: what advantage does the Metro have over the car? (diminished air pollution, fewer parking lots, less congestion, *etc.*).

Air Canada or Montreal Harbour:

Why do we have so many forms of transportation?

What are the uses of each? What are some advantages and disadvantages of each?

The Child's Clothing

Discussion

Everyone needs clothing, but how much?

Where do we get it? Where is it made? How does it get to the place where we buy it?

Why do we need various kinds of clothing? of materials? What kinds of material are natural, synthetic?

Now that you have your clothes, do you like them? If not, why not? How do you take care of them? Are you especially fond of some very old clothes and are you sorry to see them get too small? Are they still in good condition so you can give them to someone else?

What about clothes long ago? How did people get them? Who made them? Did they have as many as we have? Did styles change so often?

We like new styles, but if they change too often, doesn't that mean that many clothes are never worn out? What happens to them? Do you have clothes in your closet that you hardly ever wear? Isn't that waste?

Film: *Fine Feathers*

Story: *Pelle's New Suit* - a classic by Elsa Beskow, translated from the Swedish by M.L. Woodburn, 1929 - shows where the things we use come from. Ages 5 - 8.

Projects

Fashion Scrapbook:

Pictures from old magazines and photo albums show changes from year to year - what has happened to all those clothes?

Recycling used clothes:

Organize a "good used clothing" drive at the school.

Request that all items be clean and in excellent repair.

Pack and deliver to needy agency, emphasize the usefulness of having cared properly for the clothing in the first place.

Make a quilt or clothing from scraps. With the help of the home economics class or willing students, cut the salvageable parts of outgrown or partially worn clothing into squares or rectangles of the same size. Sew them together into strips and then stitch the strips into expanses of material from which you can make patchwork skirts, dresses, *etc.*

Trip:

Visit Upper Canada Village or similar museum and watch how clothing and fabrics used to be made. Would they have been discarded as quickly then as now?

Soft Drinks

Discussion

- Where do we get them?
- What's in them? How are they made?
- Do you like them? Do you need them?
- When you buy them, what kind of container do you choose?
- What kinds of containers are there?
- Which are easier, harder to get rid of? Where do they go?

Film: *Menu*

Trip

Bottling Plant, Supermarket:

- What kinds of containers and packaging can be seen here?
- What kinds cause garbage disposal problems?
- How can we cut down on household garbage?

Speaker

Ask representative of glass company (Consumers or Dominion) or someone from STOP to come and speak to your class about recycling.

Projects

Glass recycling: One-day Community Waste Glass Drive.

Evaluate the problem: What kinds of glass containers do we put into the garbage? What could the class do to help reuse or recycle it?

Call Consumer Glass Co. and Dominion Glass Co. for address and operating hours of their recycling depots. Choose one nearest your school.

Arrange to have a truck for a full day. Borrow one from town by contacting the Town Engineer and politely requesting, or from any other source you may know of. Bottling companies might lend you one for the publicity.

Publicity:

Announcements should go out at least one month before depot day. Send notices home with children; place posters throughout the community; put notice in local newspaper.

Message must be clear and complete: Save all glass normally put into garbage; bring to school depot before 2:00 p.m., date _____, address _____; labels may be left on but containers should be rinsed clean and all metal parts or metal foil removed. In printing and distributing publicity, do not waste or litter paper!

Send out follow-up publicity to newspaper and radio stations just prior to depot day.
Note: While you do not want to handle returnables, when saying so, commend people for using them.

Planning depot: (saves work and confusion)

Divide yard into three separate areas: receiving - where part of the group unloads cars, passes out "thank you" sheets with explanation of project; sorting and counting - where group counts containers and sorts as to colour, which must be done if glass companies are to accept glass and pay you for it; loading - area where cartons are placed when ready to put on truck.

Assign several pupils the job of folding bags and picking up litter so yard is clean when you are finished and bags are saved for reuse.

Plan to take lunch in shifts, as lunch hour is a busy time in the yard.

Follow-up:

Write letters of thanks to those who may have helped.

Send any money raised to an organization dedicated to preservation of the environment, or buy ecology books for your library.

Review the purpose of the project: recycling and elimination of wastefulness, not money-raising, although it is worthwhile to point out that conservation is good economics.

RELATED TRIPS

Museums

- Fine Arts Museums:

  Things here are considered very valuable, yet they are very old. Why are they valuable?

  Will things made today in factories be valuable some day?

  How were these things made? with what materials? by whom?

  How were old buildings built? Did it take longer than it does now? Was it done with greater care?
  See page 35 "What is Heritage Canada".

  Among the children's possessions are there a few old things they really value? Have they things that they have made, or that others have made for them? How do they feel about these things? Would they trade them for something similar but new and shiny? If so, why? If not, why not?

  New sometimes means better. How do we decide? Works better? Fits better? Does new always mean better? Does more sometimes mean less pleasure from each?

  Film: *Fine Feathers* - change for change's sake sometimes backfires!

- Canadian Railway Museum, Delson, Quebec.

- Maison St. Gabriel, Point St. Charles.

- Fort Chambly and Fort Lennox.

- Electrical Museum, Longueuil.

- Chateau de Ramezay.

- McCord Museum:

  What is on display?

  Why are these things no longer used?

  What resources were needed to produce or operate them?

  Is there still a need for the service they provided? By what have they been replaced? Are newer models more ecologically sound?

Public Library

This is a recycling center of sorts as books, magazines, newspapers and perhaps, records and tapes, are shared by many people. Ask:

Do some readers mistreat books? How?

What efforts are made to repair them?

What becomes of magazines and newspapers when they have left the shelves?

How many people use this library and who pays to maintain it?

What other public facilities cut costs and save resources - (transportation, recreation, *etc.*).

Follow-up

Point out that the number of times a book or, for that matter, almost any article can be used, depends largely on its quality and on the care it receives. However, certain things are designed to be thrown away after one use - plastic bags, paper cups, napkins, towels, diapers, soft drink cans, *etc*... What problems have arisen?

Newspaper Publishing Company

This trip might be tied in with a research project on the pulp and paper industry which causes serious environmental problems in Quebec.

How many tons of paper does this company use everyday? (Each ton represents 17 trees).

How many papers are unsold? Are they recycled?

Follow-up

What paper products are used in the classroom? Discuss ways to reduce waste. Weigh contents of wastepaper basket at the end of the day and then repeat several days later. Any improvement?

If there is a local recycling depot, plan a project to stimulate community awareness and support.

PART IV

THE CHILD IN THE COMMUNITY

"...indirectly you are raising children of good will when you keep alive a child's eager curiosity about the world around him.... A feeling of reverence for all forms of life can carry over to respect for all kinds of people."

Edith Neisser

SHARING

The development of a sense of fairness, justice and responsibility is basic to the child's understanding that the earth is a home to share.

In the Family and Home

- How many people are there? pets?
- Whose home is it? the child's? everybody's?
- How do we share our space? food? possessions?
- To whom does the air belong? the water? Why don't we cough in someone's face? Why do we turn taps and lights off?
- Why do we have to be quiet sometimes?
- Are there rules about these things? Who makes them?

At School

- Whose school is it? Who shares it? What was on that piece of land before the school was built?
- What rules are there? Who makes them? (*e.g.*, Why should we stay home when sick?)
- How are manners and consideration different from rules?
- What supplies are there here? (books, papers, *etc.*). How can we be less wasteful of them? Why?

- Who takes care of the grounds and building? See what we have after a week of no maintenance. Who should help? (*e.g.*, where should we put waste paper? What if there isn't a proper place? - in your pocket! Why?). Who cleans up if you don't? Is it fair? (Even if a person is paid to do a job, is it fair for anyone to make it harder or less pleasant?). How can we clean up the school yard? (paint trash cans, have pollution monitors, *etc.*).

In the Neighborhood

- Who owns the air, water, parks, buildings?

- Who is responsible for their protection and care? Who should help? What services are needed? Try to describe a model community.

- Who uses and misuses them? Is it fair?

- Where do we get our food? How does it get there? Is it scarce? Is it scarce in some other communities? Does anyone help? Could we waste less?

In Canada

- Do some parts of the country have better air than others? Why? Cleaner water? Why?

- Do some parts grow more food than others? Why? Is the food shared? How?

- Are some provinces or areas richer (in money) than others? Why?

- Who or what body tries to make sure the essentials of life are shared?

- Should rich provinces share their resources with less prosperous areas? Is this done? If so, how?

- The air and water belong to everyone - should anyone be permitted to spoil it? What steps are being taken to protect air, water, and land?

- What about animals? They live here too. Is it fair to spoil their home (habitat)? Who protects them? Who can urge the government to try harder?

In the World

- Who owns the oceans? the sky?

- Some parts of the world have poor land - why? Naturally poor, or spoiled through neglect or bad management?

- Some parts of the world have a great many people in a small area - what happens then, especially if food is scarce?

- Some parts of the world grow a great amount of food. How is the world's food supply shared? Could this be done better? Does most of our food come from Canada or other countries? What are some of the problems, *e.g.*, cost of transportation, distribution?

- What are the most important things for humanity to share? The essentials of life (food, air, water, shelter)?

- How could the air, water (particularly international waters) and soil be protected? Who could make the rules? What role can the oceans play in the future? (See Alvin Toffler's *Future Shock)*

FILMS

See description on Film List.

The Hoarder - excellent for all grades

Boomsville - Gr.5-7

Cosmic Zoom - Gr.5-7

Citizen Harold - Gr.4-7

TRIPS

Community

Visit City Hall, offices and departments (police, fire, health, recreation).

- Why do we need all these services? What is the town's population?

- Where does our water come from? Where do the sewage pipes go? Where should they go?

- Where is the garbage taken? What then?

- Do we have enough parks? Are there playgrounds? Are there parks just for walking and sitting?

Attend a Council meeting - see the people who make the laws.

- How are they chosen? for how long?

- What can people do if they don't like the laws or if they have suggestions?

Invite the town manager or another official to come and speak to your class, describing the town's origin, development, planning for the future. If there are older people with interesting stories to tell about earlier Canadian life, invite them to class.

Cemetry (if the idea doesn't bother anybody)

- What do the names of the people buried here tell you about their origin?

- Does it seem that people used to live shorter or longer lives? Why?

- Does it seem that people used to have larger families? Or perhaps people didn't move away to live and die far from their families?

- Was there an epidemic or disease that affected many people at a certain time in the town's history?

PROJECTS (Gr. 6 - 7)

What is the Montreal Urban Community?

- What are its responsibilities?

- Why would it be harder for the member communities to control air pollution, build sewage treatment plants, *etc.*, by themselves?

- Why do cities need urban planning departments?

- Name some cities in North America where there is evidence of insufficient or poor planning.

What is Environment Canada?

- Who is the Minister in charge?

  Write Information Canada in Ottawa, requesting information about this department.

- Follow related events and reports in the newspapers. Keep scrapbooks or posters of current environmental news.

- How does the Federal Government's department share the work with the provinces?

- Who is responsible for environmental quality in Quebec? (what Minister?) Bring newspaper clippings about his remarks and activities to class.

What is Heritage Canada?

- For information about this charitable foundation dedicated to the preservation of Canada's man-made and natural heritage, write:

  Heritage Canada
  P.O. Box 1358, Sta."B"
  Ottawa, Ontario. K1P 5R4

- Why are many people in the community concerned and saddened about the demolition of certain old properties? What now stands in their place? What are some of the disadvantages or advantages of these developments, and for whom? Have the children express their own feelings on this subject in poetry, essays or artwork.

What is the United Nations role in environmental protection?

- What international conferences on the environment has the United Nations sponsored, and with what results?

  The Stockholm Conference, 1972
  The Law of the Sea Conference - Caracas, 1975
  The World Food Conference - Rome, 1974
  The World Population Conference - Bucharest, 1974

- Which Canadian heads the U.N. efforts on the environment? (Maurice Strong).

Write for information to:

The United Nations Association
Montreal Branch
4335 Hampton
N.D.G. H4A 2L3
(Tel: 482-8356)

What biographies might be pertinent?

Human history includes the names of many outstanding people who lived in close harmony with nature. If life style and values have had a lot to do with bringing about environmental problems, if there has been unwillingness to respect natural laws, unwillingness to share life with animals and other men, children might be pleased to learn about some of these special people who, above all, loved life and living things.

Charles Darwin - English naturalist

John J. Audubon - French naturalist

Henry David Thoreau - American philosopher and writer

Saint Francis of Assisi - Italian monk

William Wordsworth - English poet

Albert Schweitzer - German physician, philosopher, *etc.*

Tom Thomson - Canadian painter

Rachel Carson - American biologist

Linnaeus - Swedish botanist

Biographies and other material about these people are available in most children's libraries. What can be learned from them?

Another group whose harmonious relationship with nature is now being recognized is the North American Indians. Watch for biographies and fiction, such as *Agouhanna* by Claude Aubry.

Who in the news, locally or elsewhere, is active in some field of environmental protection -

- land use (heritage property, green spaces, *etc.*)

- pollution abatement

- preventive medicine or world health

- wildlife protection

(See Appendix)

FILM LIST

The films here have been seen and judged to be well suited for use in the elementary grades. All can be borrowed from the National Film Board, 550 Sherbrooke Street West, Montreal, for a period of up to one week. They should be requested two weeks in advance and must be picked up from and returned to the office.

If information on the Film Board's full range of environmental films is desired, brochures are available.

I. TO STRESS THE IMPORTANCE OF ATTITUDES AND BEAHVIOR

The Hoarder - 7 minutes 30 seconds, colour, 16mm 106C 0169 064.

A beautiful animated film about a bluejay who takes whatever his beak can grasp and carry. Into his secret cache go berries, birds' eggs, nest and all. Even the sun in the sky is unsafe from his consuming greed. In the end the bluejay learns a lesson and birdland returns to normal. Excellent for early grades and as basis for discussion at higher levels. (K - Gr.7)

Fine Feathers - 5 minutes 30 seconds, colour, 16mm 0168 047.

Another fine animated cartoon by the artist who produced *The Hoarder* - on the follies of pride and vanity. Points out possible problems of "change for change's sake".

Rise and Fall of the Great Lakes - 16 minutes 40 seconds, colour 16mm 106C 0163 004.

A lesson in Canadian geography which concludes that though the Great Lakes have had their ups and downs, nothing has been harder to take than what man has done to them lately. (Gr.5 - 7)

Citizen Harold - 8 minutes 37 seconds, colour, 16mm 106C 0171 096.

Harold liked spending his free time in front of his TV set but the sight of trees falling in a neighborhood park roused him to challenge City Hall. Good cartoon on making one's voice heard.

II. ON THE BEAUTY, ORDER AND UNITY IN NATURE

A Tree is a Living Thing - 10 minutes, colour, 16mm 106C 0164 020.

How a tree feeds, breathes, grows - excellent for preparation for an outdoor trip. (Gr.2 - 5)

The Changing Forest - 18 minutes, colour, 16mm 106C 0161 078.

The forest as an integrated community of living things - also why the maple tree is best able to survive the struggle for supremacy in the Laurentian forest area. Another excellent film to show before a nature trip. (Gr.6 - 7)

The Flower and the Hive - 10 minutes 30 seconds, colour, 16mm 106C 0161 006.

The relationship between the activities of bees and the fertility of field and orchard crops. (Gr.3 - 6)

Butterflies, Beetles and Bugs - 16 minutes 30 seconds, colour, 16mm 106C 0161 078.

Introduction to insects for older children who might be aware of the pest control problem - shows nature's way of handling it. (Gr.6 - 7)

Tuktu and His Animal Friends - 14 minutes, colour, 16mm 106C 0167 151.

A look at the small animals that live in the Arctic - shows the great natural beauty of the Canadian North. (Gr.3 - 6)

Beaver Dam - 15 minutes, colour, 16mm 106C 0160 044.

Children will enjoy watching beavers at work and two small boys' efforts to protect the animals. (Gr.2 - 5)

Animal Movie - 10 minutes, colour 16mm 106C 0166 014.

A little boy discovers how difficult it is to imitate the way animals move but when he climbs into a machine, any kind of travel is possible. Because he has these machines, is he forgetting that he is still bound to nature? (Gr.1 - 5)

World in a Marsh - 21 minutes, colour, 16mm 106C 0156 0044.

For older children - a beautiful film in which "strange insects, small amphibious creatures and birds that prefer watery haunts, devour and are devoured according to nature's stern decree of balance and survival of the fittest". (Gr.6 - 7)

Cosmic Zoom - 8 minutes, colour, 16mm 0168 104.

From the farthese point of the universe to the finest particle of existence - a film which depicts nature in its largest sense - inspires awe and wonder. (Gr.3 - 7)

Tuktu and the Snow Palace - 14 minutes, colour, 16mm 106C 0167 149.

Tuktu, the Eskimo boy, his family and friends building igloos - a shelter for a different environment. (Gr.3 - 6)

III. THE CHILD AS A PART OF NATURE - HEALTH

Menu - 22 minutes, colour, 16mm 106C 0167 147.

A good film about diet for children in which a playful litter of pups from the RCMP kennels are used to demonstrate the relationship of sensible food to energy and growth. (Gr.4 - 7)

King Size - 6 minutes, colour, 16mm 106C 0168 079.

Good anti-smoking cartoon to show when discussing air. (Gr.1 - 7)

IV. ENVIRONMENTAL PROBLEMS GETTING OUT OF HAND

Boomsville - 10 minutes, colour, 16mm 106C 0267 064.

Urban growth. The film traces the growth of a city from a tiny settlement in the vast North American wilderness to the car-clogged metropolis of today. Problems are so serious because of lack of planning (See The Child in the Community). (Gr.5 - 7)

What on Earth - 9 minutes, colour 16mm 106C 0166 033.

"This film shows what many earthlings have long feared - and what Martians might logically deem to be the case - that it is the auto that has inherited the earth". A good animated film on the problem of too many cars. (Gr.5 - 7)

Rise and Fall of the Great Lakes - described in Section I.

The Quiet Racket - 7 minutes 23 seconds, 106C 0166 045.

"An amusing tale of a man who feels the common urge to escape the city's noise for a week-end of quiet in the hills. He finds the country-side not so unspoiled and uncrowded." Only fair, because the man rides a very noisy motorcycle and is so citified that he minds the real sounds of the country, *e.g.*, crickets.

Paradise Lost - 3 minutes.

A beautiful but sad animated film which shows "wildlife agony because of man's technological abuses". A bird and a butterfly die after their garden has been too heavily sprayed. (Gr.6 - 7). Possibly too strong a statement.

TEACHING RESOURCES

GENERAL READING

Silent Spring, Rachel Carson
Pollution Probe, D.A. Chant
The Frail Ocean, Wesley Marx
Vanishing Air, Ralph Nader Study Group
The Wastemakers, Vance Packard
The Closing Circle, Barry Commoner

MAGAZINES AND PERIODICALS

The Journal of Environmental Education - DERS, Box 1605, Madison, Wisconsin 53701. $10/4 issues
Environment Magazine - 438 North Skinker Blvd., St Louis, Mo. $8.50/10 issues
Eco-News - Environmental Action Coalition, 235 East 49th St., New York 10017.

PAMPHLETS (Free)

Strategies for Survival - Canadian Imperial Bank of Commerce Newsletter, Jan/Feb 1973 - write to Head Office, Toronto.
Conserving Canada's Wildlife - Royal Bank of Canada Newsletter, Vol. 52 #8, Aug. 1971 - phone Head Office, Montreal.
Environment and You - Environment Canada, Ottawa.
Let's Unpollute - in comic form for children - Environment Canada, Ottawa. Information on air, water and soil pollution. Puzzles and games for elementary school children.

VISUAL MATERIALS

Poster - 42 1/2" x 29 1/2" depicting how man pollutes his world. May be ordered from National Geographic Society, Dept. 61, Washington D.C. $2.00

Reprints, filmstrips and transparencies - for information write Life Education Program, Box 834, Radio City Post Office, New York 10019.

Some reprints include:

Air Pollution, #69
Water Pollution: The Blighted Great Lakes, #76
Vanishing Wildlife: The Mammals, #89
Vanishing Wildlife: The Birds, #90

Science Year 1971 - World Book Encyclopedia - many informative articles, *e.g., A Lake Decays*, which includes excellent transparencies on eutrophication.

CURRICULUM MATERIALS

Environmental Education for Everyone - a bibliography of curriculum materials for environmental studies. Write to National Education Association, 1201 Sixteenth St.N.W., Washington D.C. (.75¢)

Education for Survival - Social studies and science curriculum guide for grades 1, 2 and 3 by the teachers of Madison, N.J. Write the North Jersey Conservation Foundation, 311 Mendham Road, Morristown, N.J. ($3.75)

A Place to Live - excellent for use at the intermediate elementary level, it includes two books:

Workbook ($1.00)

- 64 pages covering basic ecological concepts as found in any urban environment
- suitable for grades 4 and up
- activities involve writing or drawing in the book, as well as group activities
- 10 walks (Tree Walk, Ant Walk, *etc.*) related to the text and not requiring transportation which provide first-hand discovery experience

Teacher's Manual ($1.75)

- ample supplementary material
- each section of the workbook is treated under the following headings: Introduction, Understandings, Suggested Topics, Background Information, Teaching Tips, *etc.*
- many suggestions for correlating this program with other subjects
- detailed directions for walks. Teachers inexperienced in taking walks with children will find these sections particularly useful.

Order from: Educational Services
National Audubon Society
950 Third Avenue
New York 10022

Save the Earth - Betty Miles, Knopf. Good projects for gr.5 - 7.

Ecology: Man and His Environment ($5.00)

A curriculum designed for grades 6 - 9 by

Frances P. Friedman
Asst. Prof. of Education
Concordia University

available from Concordia University
Sir George Williams Campus
Montreal, Que.

Outdoor Education Manual, Parts I and II ($2.00 each)

by Ontario Teachers' Federation
Suite 550 - 1260 Bay Street
Toronto 185, Ont.

200 Outdoor Science Activities ($1.50)

by Ontario Teachers' Federation
Suite 550 - 1260 Bay Street
Toronto 185, Ont.

Adventure in Environment - A Teacher's guide, grades 3 - 4 level.

A series of lessons which suggest "a way of looking at the world that actually ties the various fragments, *e.g.*, math, music, history and biology, into an understandable whole".

Silver Burdett Company (.90¢)

10-Minute Field Trips - A Teacher's Trial Edition for use in the Primary Grades.

Wave Hill Center for Environmental Studies
675 West 252 Street
Bronx, N.Y. (K - 3)

All Around You - An Environmental Study Guide.

Combined teacher's manual and worksheets on awareness, the urban ecosystem, and nature's ecosystem. Adaptable for all levels, with an excellent bibliography.

U.S. Bureau of Land Management
Order from Superintendent of Documents
U.S. Government Printing Office
Washington D.C. 20402
Stock Number 2411-00043 ($2.50)

CHILDREN'S READING LIST

No environmental reading list could be complete, but here are the names of some books, most of them reviewed by people interested in the promotion of environmental studies.

CHILDREN'S FICTION CLASSICS

While many new books are available, some classics in children's fiction will surely remain unsurpassed for the way they teach the highest in human values. They need no further comment.

Winnie the Pooh and *House at Pooh Corner*, A.A. Milne

Wind and the Willows, Kenneth Graham

Charlotte's Web, E.B. White

Rabbit Hill, Robert Lawson

Tom Sawyer and *Huckleberry Finn*, Mark Twain

The Story of Dr. Doolittle, Hugh Lofting

ECOLOGY BOOKS FOR CHILDREN

The North American Bighorn Sheep, Mary Adrian.

Illustrated by Genevieve Vaughn-Jackson. Hastings, 1966. $3.50. Age 8 up.

The birth, young life, and struggle for survival of the Bighorn sheep in their native habitat. Easy to read, with clear descriptions of the wildlife community.

A Place to Live, Jean Bendick.

Parents Magazine Press, N.Y., 1970. $3.47.

"A total picture of ecology written in language children can understand - a very timely book for the young child and an enjoyable one."

The Community of Living Things in Fresh and Salt Water, B. Bartram Cadbury.

The National Audubon Society, 1960. $4.95. Age 6 up.

Furthers an understanding of the nature of fresh and salt water and the parts they play in communities of plant and animal life. Stresses the importance of keeping the water supply clean.

Patterns of Living: Foundations of Ecology, Michael Chinery and David Larkin.

Low, distributed by Ginn, 1967. $5.95. Age 8 up.

Climate, soil, and the influences of animal and plant populations as determinants of an environment. Includes sea and land environments. Gives the meaning of balance of nature, and an overview of animal behavior.

Jean George Craig. This author-naturalist has written a series of moon cycle books concerned with phenology, relating climatic changes to biological activity.

The Moon of the Mountain Lion, Jean George Craig.

Illustrated by Winifred Lubell. T.Y. Crowell, 1968. $3.75. Ages 8 - 12.

The setting is the mountain lion in the Mount Olympus area of Washington during the August moon. There is a sadness as the animals prepare for winter, although the mountain lion finds a mate to whom he will be faithful for life.

The Moon of the Owls, Jean George Craig.

Illustrated by Jean Zallinger. T.Y. Crowell, 1967. $3.25. Ages 7 - 11.

A January night as seen by a great horned owl who seeks first his food and then his mate. The balance of nature, the predator and the hunter, food chains, and inter-relationships between living creatures are well presented.

The Moon of the Salamanders, Jean George Craig.

Illustrated by John Kaufman. T.Y. Crowell, 1967. $3.25. Ages 7 - 11.

A blue-spotted salamander on the first night of the first spring rain. The story is rich in relationships between animals and their surroundings. The environment includes a range from snails to shrimp, screech owls to woodpeckers, and peepers to beetles to spring flowers.

The Moon of the Wild Pigs, Jean George Craig.

Illustrated by Peter Parnell. T.Y. Crowell, 1968. $3.75. Ages 8 - 12.

The month is July and the setting is the Sonoran Desert. A little peccary becomes lost and in trying to find its clan he meets tarantulas, rattlesnakes, road runners, and other desert animals. A stress is given to the adaptations of

desert life forms to their environment. The story includes a sudden rain and the metamorphosis it brings to the desert.

Partners in Nature, Ruth H. Dudley.

Illustrated by Eva Cellini. Funk and Wagnalls, 1965. $3.02. Ages 5 - 8.

In a simple and interesting manner symbiotic relationships are presented: mutualism with both partners benefiting, commensalism with one partner benefiting and the other tolerant, and parasitism with one partner thriving on the other.

Understanding Ecology, Shelly Grossman.

Grosset and Dunlop, 1970. $4.00. Age 10 up.

"A dramatic story of the chain of life" with beautiful photographs.

The Coyote, Iona Seibert Hiser.

Illustrated by J.M. Roever. Steck-Vaughn Co., 1968. $2.25. Ages 6 - 10.

An ecological study of the coyote stressing relationships between animals and their environments. The story removes stereotypes about the coyote and he becomes an appealing part of his environment.

Whitetail: The Story of a White-tailed Deer, George Laycock.

Norton, 1966. $3.28. Age 8 up.

A moving description of the white-tailed deer and his struggle for survival against natural and unnatural enemies: the bobcat, wild dogs, and man, and the long winter when his food supply is short.

In a Running Brook, Winifred Lubell and Cecil Lubell.

Illustrated by Winifred Lubell. Rand-McNally, 1968. $3.95. Ages 6 - 10.

A clear, simple, and absorbing story of the fishes, amphibians, insect larvae, crustaceans, poriferas, planarians, and aquatic vegetation of a running brook. Well recommended.

Because of a Tree, Lorus J. Milne and Margery Milne.

Drawings by Kenneth Gosner. Atheneum, 1963. $3.95. Ages 4 - 7.

An ecological study for young children, emphasizing the interdependence of trees, and various insects, plants, and animals.

The Community of Living Things in Field and Meadow, Etta Schneider Ress, ed.

In cooperation with The National Audubon Society and the Creative Education Society, 1960. $5.95. Ages 6 - 10.

A picture story of how plants and animals live together in fields and meadows.

Nature in the City, John Rublowsky.

Illustrated. Basic, 1967. $4.95. Age 10 up.

Tells about a changing environment which involves a shift from open country to densely populated urban areas. Organisms must adapt in order to survive. Suitable for a city child who wishes to discover plant and animal life teeming in parks, sewer systems, cemetries, and back-yards. Well recommended.

The First Book of Swamps and Marshes, Frances C. Smith.

Illustrated with photographs. Watts, 1969. $2.95. Age 8 up.

Distinguishes bogs, swamps and marshes, and describes the ecological complexes within each of these. Tells about food chains, modifications effected by beaver dams, seasonal changes, and changes that come naturally with the sesescence of the immediate area.

ECOLOGY PICTURE-STORIES FOR YOUNG CHILDREN

I. Experiencing the Environment

Where is Everybody? Remy Charlip.

Illustrated by the author. E.M. Hale & Co., Eau Claire, Wisconsin, 1962. Age 4 up.

This is a simple and highly original book. The author-illustrator is a dancer as well and this is indirectly reflected in his story. It begins with a blank page, "Here is an empty sky". Each page brings an addition - sun, bird, hills, fish, trees, etc. When the rain comes they seem to disappear, but the child who looks carefully will find "where everybody is".

Tia Maria's Garden, Ann Nolan Clark.

Colored illustrations by Ezra Jack Keats. Viking Press, N.Y. 1963. Ages 5 - 8.

Tia Maria's son enjoys the desert of the Southwest, a world of sand, sun, wind, rocks and sudden thunderstorms, where curiously shaped plants, Jack rabbits, lizards, and quail make their home. The author has spent many years in desert country, and her familiarity and affection for it are apparent.

Who likes the Sun? Beatrice Schenk DeRegniers.

Colored illustrations by Leona Pierce. Harcourt, Brace & World, N.Y., 1961. Ages 4 - 8.

Told in the first person, this is a simple story of the sun warm on the pussycat's fur, the sun on the sand too hot for fare feet, and making shadows in the sunlight. The illustrations are attractive whimsical woodcuts.

Gilbert and the Wind, Mary Hall Ets.

Drawings by the author. Viking Press, N.Y., 1963. 32 pages. Ages 4 - 7.

A little boy finds the wind to be an unpredictable playmate. Gilberto's expressions and stance change in accord with the wind; he runs through windy grass, tries to fly a kite on a windless day, and sees a strong wind that breaks a tree.

Going Barefoot, Aileen Fisher.

Colored illustrations by Adrienne Adams. Thomas Y. Crowell, N.Y., 1960. Ages 4 - 8.

In fresh and unsentimental poems a boy anticipates and discovers the world around him during all seasons. Barefooted animals and birds are depicted and the colors and smells of both country and city.

The Day we saw the Sun come up, Alice E. Goudey.

Colored illustrations by Adrienne Adams. Charles Scribner's Son, N.Y. Ages 4 - 7.

From sunrise to sunset two children watch changes in light and shadow. The softly colored illustrations relate well with the text.

Up the Big Mountain, Dorothy Koch.

WaterOcolor illustrations by Lucy and John Hawkinson. Holiday House, N.Y., 1964. Ages 5 - 8.

A little girl and her brother climb a mountain and discover birds, blueberries, wildflowers, and a waterfall along the way. The water-color illustrations are an integral part of the freshness of the book.

The Beach before Breakfast, Maxine W. Kumin.

Colored illustrations by Leonard Weisgard. G.P. Putnam's Son, N.Y., 1961. Ages 5 - 8.

A boy and a man enjoy the beach early in the morning. They discover an abundance of life in the water and along the shore. The distinctive illustrations express the mood of the beach.

Time of Wonder, Robert McCloskey.

Colored illustrations by the author. Caldecott Medal Award. Viking Press, N.Y., 1957. Ages 6 - 9.

A family spending the summer on an island in Maine experiences the woods and the beach as safe and secure until a hurricane comes bringing wind and darkness. The next morning the children explore the results of the storm.

Hide and Seek Fog, Alvin Tresselt.

Colored illustrations by Roger Duvoisin. Lothrop, N.Y., 1965. Ages 5 - 9. 28 pages.

When the fog rolls in the children enjoy the changes it brings. The story flows in sensory images of sight, sound and touch. The misty luminous illustrations are evocative and convey the clammy aura of fog.

White Snow, Bright Snow, Alvin Tresselt.

Colored illustrations by Roger Duvoisin. Caldecott Medal Award. Lathrop, Lee & Shepherd, N.Y., 1947. Ages 4 - 8. 34 pages.

Gaiety and humor characterize both the text and the illustrations. The author writes here, as in his other stories, about weather and changes in seasons. The children watch the snowflakes and when the snow is deep they play in it.

A Tree is Nice, Janice May Udrey.

Colored illustrations by Marc Simont. Harper, N.Y., 1956. Caldecott Medal Award. Ages 4 - 8.

The children climb trees, they pick apples, and they play in the leaves on the ground. They say little; the story is told mostly by the lively pictures.

All Falling Down, Gene Zion.

Colored illustrations by Margaret Bloy Graham. Harper & Row, Evanston, 1951. Ages 4 - 7.

An enjoyable time with falling down: rain, leaves, snow, shadows, and night and stars. The large two-page illustrations have details children like finding.

The Storm Book, Charlotte Zolotow.

Colored illustrations by Margaret Bloy Graham. Harper, N.Y., 1951.

A thunderstorm sweeps over country and city, driving the heat away and ending with a rainbow. The force of the storm as well as the beauty are conveyed.

II. Relationship with Wild and Untamed Animals and Birds

The Happy Hunter, Roger Duvoisin.

Lathrop, Lee & Shepherd, N.Y., 1961. Ages 4 - 8. 31 pages.

A gently humorous story, especially in the illustrations, of a hunter who fails to use his gun. Year after year, each time he goes hunting the hunter unknowingly warns the animals. The repetitive pattern amuses the children. The animals realize the hunter's love for them and together they pay him a visit.

Listen Rabbit, Aileen Fisher.

Colored illustrations by Symeon Shimin. Thomas Y. Crowell, N.Y., 1964. Ages 4 - 7.

Told in the first person, a young boy wants to make friends with a rabbit. The rabbit avoids being caught but the boy is enchanted when he discovers her nest with five baby rabbits in it.

Come Again, Pelican, Don Freeman.

Illustrated by the author. Viking, N.Y., 1961. Ages 6 - 8. 44 pages.

A small boy and a pelican, each fishing in his own way, make surprising catches. The dunes, sea, and sky are well pictured.

Fly Away, Goose, Fen H. Lasell.

Illustrated by the author. Houghton Mifflin Co., Boston, 1965. Ages 7 - 10.

A young girl who knows the fate of the barnyard geese imagines what would happen if she didn't take the goose's egg but left it to be hatched by the mother goose. She thinks of a young gosling that she will care for; she won't fatten it for market, she will nurture it until it can fly away. This is a gentle story which draws realistic conflict into it.

Klya the Gull, Fen H. Lasell.

Illustrated in three colors by the author. Addison-Wesley, N.Y., 1969. Ages 7 - 12.

Within the few days of the story a wild gull is entrapped and in danger of starving, until he is set free by a young boy. The story is sensitively written and illustrated.

The Tomten and the Fox, Astrid Lindgren.

Colored illustrations by Harold Wiberg. Coward-McCann, N.Y., 1966. Ages 4 - 8. 28 pages.

Adapted from a Swedish poem, this is a simple story of a hungry fox who threatens the safety of the farm animals. A tomten saves them and brings the fox a meal of warm porridge. The distinctive and unusual illustrations are full page, reflecting the peaceful quiet of a winter's night, and the warm close feeling between the old tomten and the animals.

Saint Francis and the Animals, Leo Politi.

Colored illustrations by the author. Charles Scribner's Sons, N.Y., 1959. Ages 6 - 9.

This is a charming series of stories which includes *Francis Preaches to the Birds*. The book is a personal and rich expression of the author-illustrator.

Joel and the Wild Goose, Helga Sandburg.

Colored illustrations by Thomas Daly. Dial Press, N.Y., 1963. Ages 5 - 8.

A lonely boy finds a wild goose wounded by hunters. He cares for it through the winter and lets it fly away in the spring. The author, who is the daughter of Carl Sandburg, gives originality to this old theme.

The Rabbit Story, Alvin Tresselt.

Illustrations in brown tones by Leonard Weisgard. Lothrop, N.Y., 1957. Ages 4 - 7.

Told mostly from the rabbit's point of view, a wild rabbit loses her freedom and becomes the farmer's son's pet. When the crisp fall weather comes she remembers her wild free life and she escapes to the thickets. The illustrations give distinction to the book.

Amos and Boris, William Steig.

Illustrated by the author. Farrar, Straus & Giroux, N.Y., Doubleday Canada Ltd., Toronto, 1971. Age 6 up.

The touching story of Amos, the mouse and Boris, the whale, who inadvertently enter eachother's world, help each other, and cherish their friendship.

III. Living with the Environment and Using It

Pelle's New Suit, Elsa Beskow.

Colored illustrations by the author. Translated from the Swedish by Marion Letcher Woodburn. Harper, N.Y., 1929. Ages 5 - 8.

Although this story was written forty years ago it should not become dated. Pelle raises his own lamb and then watches and helps in the processes of making the suit from shearing to spinning wool, from dyeing to cutting the cloth. The story shows well where the things we use come from.

In My Mother's House, Ann Nolan Clark.

Colored illustrations by Velino Herrera. Viking Press, N.Y., 1941. Ages 7 - 11.

A young Indian girl tells about daily life in the pueblos and fields. The author's cadenced style of writing, combined with the symmetry of the illustrations, creates a book of unusual harmony.

The Real Hole, Beverly Cleary.

Colored illustrations by Mary Stevens. Morrow, N.Y., 1960. Ages 4 - 7.

Four-year old Jimmy surprises his family by digging a very big hole, and his father buys a tree to plant in it.

Apple Orchard, Irmengarde Eberle.

Colored illustrations by Ezra Jack Keats. H.Z. Walck, N.Y., 1962. Ages 5 - 8.

This story traces a year in the operation of an orchard, from blossoms in the spring, through the growth of the fruit, hibernation in the winter, and back to spring blossoms.

The Little Farm, Lois Lenski.

Colored illustrations by the author. H.Z. Walck, N.Y., 1942. Ages 5 - 7.

The story of Farmer Small and the work of farm life, by an author well known for her stories about country life for older children.

IV. Loss of the Natural Environment

The Little House, Virginia Lee Burton.

Colored illustrations by the author. Caldecott Medal Award. Houghton, Mifflin Co., Boston, 1942. Ages 5 - 7.

A country house sees a city grow up, step by step, around it. All of the illustrations have rhythmical curving lines, but in the country pictures they are clear and gentle, while in the city pictures they are crowded and confused.

Farewell to Shady Glade, William Peet.

Colored illustrations by the author. Houghton, Mifflin Co., Boston, 1966. Ages 5 - 7.

When bulldozers come to clear the land where sixteen animals have been living, they are forced to try to find a new home.

The Last Free Bird, A. Harris Stone.

Water-color illustration by Sheila Heins. Prentice-Hall, Englewood Cliffs, New Jersey, 1967. Age 5 up.

A poetical expression which conveys that as man becomes more numerous and harmful to nature, birds will accordingly disappear. The text is slight so that the mood is carried more by the illustrations.

V. Survival (Fantasy, Fiction and Non-Fiction)

Elf Owl, Mary and Conrad Buff.

Illustrations in brown tones by Conrad Buff. Viking Press, N.Y., 1958. Age 5 up.

The tiny elf owls look out from their home in the giant saguaro cactus; they see the struggle for survival of the desert inhabitants - animals preying on each other and the search for water in the dry heat. Finally, a storm comes and brings transformation and renewal to the desert. The text has the rhythmic quality of poetry, and the illustrations are distinguished.

Swimmy, Leo Lionni.

Colored illustrations by the author. Pantheon, N.Y., 1963. Ages 5 - 8.

After losing his brothers and sisters to a hungry tuna, Swimmy, a small black fish, joins a school of red fish. To prevent them from being eaten by a bigger fish, Swimmy

teaches them to swim together in the shape of a big fish. The pictures rather than the story are stressed, and these are unusual for showing depth in the underwater world.

The Big Island, Julian May.

Illustrated by John Schoenherr. Follet, Chicago, 1969. Ages 4 - 8.

This is a true story which takes place on Isle Royale in Lake Superior where moose thrived to the point of population explosion and subsequent starvation. By accident, a wolf pack came to the island and fed on the old and weak moose and thereby established a balance of nature.

Fox and Fire, Miska Miles.

Illustrated by John Schoenherr. Little, Brown & Co., Boston, 1966. Ages 6 - 10.

For three days while the fox is hunting for food he smells the encroaching fire. Finally, his instinct to survive becomes greater than his hunger and he runs from the flames. When the danger is over he looks for rabbits and mice but these have gone to new hiding places.

The Pine Tree, George M. Ross.

Drawings by the author. E.P. Dutton & Co., N.Y., 1966. Ages 6 - 10.

A simple and poetic story of a pine seedling's struggle for survival, mainly against the wind. The story takes place on a windswept rocky island off the coast of Maine. The story is actually an account of the life-cycle of the pine.

The Barn, John Schoenherr.

Illustrated by the author. Little, Brown & Co., Boston, 1968. Age 5 up.

An owl with young to feed and a hungry skunk fight each other for survival in a deserted barn. This is an exceptional book, partly for the striking black and white drawings of unusual strength.

Wildfire, Evans G. Valens.

Colored illustrations by Clement Hurd. World Pub. Co., Cleveland, 1963. Age 6 up.

A forest wildfire leaps into life and causes havoc with the forest animals. The story and the illustrations

make the fire dominate; however, there is lyricism and suggestion in both the text and the pictures. The story does not end on tragedy but passes through it and to the renewal of the life-cycle of the forest.

VI. Additional Reading

The following books have been read and been evaluated by interested teachers:

The Good Germ, Cherney Berg.

The Lion Press, 21 W. 84th St., N.Y. 10018. Gr.1 - 3.

Fantastic illustrations. Humorous, and factual about environment of germs. Good comment on scientific method, terminology. Excellent.

Water: Where it comes from, Where it goes, Dr. I. Freeman.

Random House, Gr.2.

Colorful, with fold-outs. Fun for a child. Clever and factual. Cycles are emphasized. Excellent.

Wildlife in Danger, I. Green.

Coward McCann. Gr.5 - 7.

Description along with photos of species threatened with extinction and why situation is so acute. Very good.

How do they get rid of it? Suzanne Hilton.

The Westminster Press. Gr.6 - 8.

Garbage, industrial waste, old cars, sewage, *etc.* Factual book, exhaustive study, and also very readable. Good index. Excellent.

The Little Knight, Syd Hoff.

McGraw-Hill Book Co. Gr.K - 3.

About a little man (knight) who beats the system and fights the battle against litter in a unique way, delightful and to the point. Excellent.

Pollution (Canada's Critical Challenge), F. Morgan.

Ryerson Press. Gr.5 - 7.

Drives home Canada's environmental situation. Photos and charts. Very good.

The Wump World, Bill Peet.

Houghton Mifflin Co., Boston. Gr.K - 3.

A humorous, cleverly illustrated, direct attack; pollution fairy tale. Excellent.

Clean Air - Sparkling Water, D.E. Shuttlesworth

Doubleday & Co. Inc. Gr.4 - 6.

Recommended by Protestant School Board of Greater Montreal. Good photos and description of fight against pollution. Excellent.

This is the World, J. VonDolzen Pease.

Rand McNally & Co. Gr.K - 1.

The world as it should be. Informative but would need supplementation to make it topical. Good.

Clean Water, Clean Air, A. Whitman.

Gr.2 - 3.

Not read by us, but highly recommended as a clear and concise book.

Animals at Home - series. Grosset and Dunlop. Gr. K - 3.

Well illustrated animal series, including animals from all types of eco-niches giving pertinent information about environment and habits. A good starter.

Beginning Science. Trees; Oceans; Soil - series.

Follett. Gr. K - 2.

Factual series on oceans, air, water, soil, trees, weather. Good illustrations. Very good.

Let's Go to a Sanitation Department - series.

G.P. Putnam & Sons. Gr. K - 2.

Introduction to neat and proper garbage disposal. So-so book but has its points. Good.

An Early Start Pre-School Reader; The Pond - series.

Wonder Books. Gr. K - 1.

Beautifully illustrated book on life in a pond. Comprehensive. Very good.

The Life of .... The Forest, Seashore, etc. - series.

McGraw-Hill and Encyclopedia Word Book. Gr. 6 - 8.

Comprehensive study of ecological niches. Well documented, illustrated and photographed.

This Thirsty World.

McGraw-Hill Co. Gr. 5 - 8.

Best book on water. It describes problems, and also gives some of the social implications involved with territoriality, future wars over water, *etc.* Goes far beyond ordinary description. Photos, charts, index. Excellent.

Your Wonderful Body, Robert J.R. Follett.

The Ryerson Press, Toronto. Gr. 2 - 5.

Well illustrated little book covering the body's parts and systems in a clear, readable style.

REFERENCES

Focus on Environmental Education, V.E. Vivian, PhD. and T.J. Rillo, PhD.

The Curriculum Development Council for Southern New Jersey, Glassboro State College, Glassboro, N.J. ($2.00).

Learning About Nature Through Games, Virginia W. Musselman.

Stackpole Books, Harrisburg, Pa. ($3.95).

Teaching for Survival, Mark Terry. Ballantine Books. ($1.25)

Tips and Tricks in Outdoor Education, Malcolm D. Swan, Ed.

The Interstate Printers and Publishers,Inc., Danville, Illinois. ($3.50).

The Scrap Book. A Collection of Activities for Preschoolers.

Friends of Perry Nursery School, Ann Arbor, Michigan.